Instituto de Investigación y Formación Agraria y Pesquera
CONSEJERÍA DE AGRICULTURA, PESCA Y DESARROLLO RURAL

Adaptation strategies to climate change for summer crops on Andalusia: Evaluation for extreme maximum temperatures

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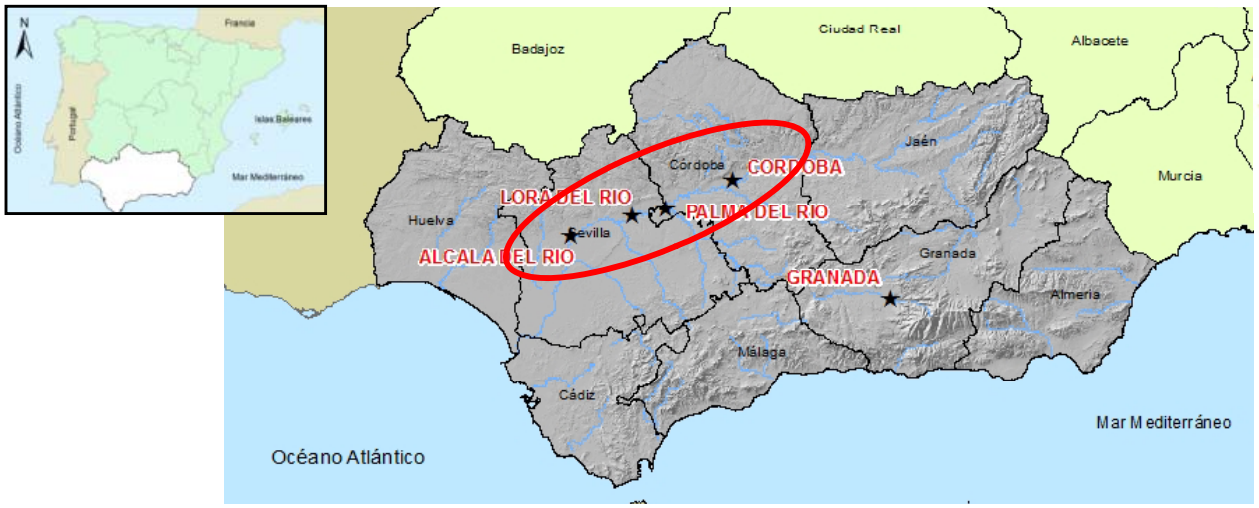
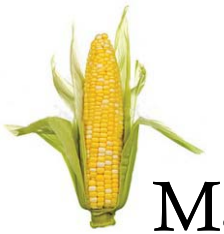
Evaluate a set of agricultural adaptation strategies to cope with climate change impacts, with focus on the consequences of extreme events on the adaptations proposed in the semi-arid environment of Andalusia (Southern Spain)

➢ Experimental, soil and management data (Andalusia Network of Agricultural Trials: RAEA).





Maize irrigated
Cultivar Helen
(FAO 700)

➢ Climate data: daily Tmax, Tmin, Precip, Radiation

PRESENT-BASELINE

1981-2010

- Agroclimatic Information Network of Andalusia (RIA)
- ERA-Interim

PRESENT AND FUTURE CLIMATE SIMULATIONS (12-14 RCM)

- ENSEMBLES project (http://www.ensembles-eu.org/)
- Bias corrected (Dosio and Paruolo 2011, and Dosio et al. 2012)

- **CALIBRATION: Genetic coefficients, potential yield**
- **VALIDATION: Independent data**

	CALIBRATION		VALIDATION	
	RMSE	MPE (%)	RMSE	MPE (%)
Anthesis (das)	3.1	4.2	5.6	7.2
Yield (kg ha^{-1})	344	2	1456.8	9

CERES-Maize crop model
(DSSAT v. 4.5 platform)

-Evaluation of climate ensembles (control period 1981-2010)
IMPACT SIMULATION
-Impact for 2021-2050 and 2071-2100

ADAPTATIONS PROPOSED

EXTREME EVENTS

Adaptation strategies

Earlier sowing date

- 15 days-step

Cultivar change

- Increasing thermal time
- Increasing grain filling rate

Combination

- Earlier sowing date and cultivar change

Extreme events

35°C 1d, 35°C 5d

YEAR

- January -December

FLO

- 7 days before anthesis to 7 days after

LAG

- anthesis to 7 days after

GRAIN

- 7 days after anthesis to maturity

Results: Publication in progress

- ✓ Increased quality of projections and reduced uncertainty by
  - ✓Site specific assessment
  - ✓Local evaluation of climate data
- ✓Locally addressed adaptation in Andalusia
  - ✓May compensate maize yields
    - ✓Earlier sowing dates and cultivar changes
  - ✓Extreme events may limit adaptation in Granada

✓Crop models has to be improved for simulating the effect of extreme events for a better quantification!!

Thank you

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